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Conference Abstract

Biodiversity Climate Shifts: shaping data transformation and evaluation

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Abstract

Ecosystem services provided by biodiversity are associated with supporting life on the planet. Climate change has negatively impacted biodiversity, altering the phenology and geographical distribution of species and the interaction between them. In megadiverse areas, such as tropical forests, studies of species interactions that consider all the species of flora and fauna are not feasible due to our limited knowledge of biodiversity and the necessity of extensive and costly fieldwork. Instead, Species Distribution Modelling (SDM) techniques can be used, together with other species information (e.g., pollination syndrome) as a proxy for these interactions to estimate spatial patterns of potential distribution dynamics. In this study, we modeled our process steps to obtain the estimated future climate shifts and identification of climatically stable areas over time. These areas may represent climatic refuges and future actions to increase the connectivity between them are strategies that could help mitigate potential future damage for biodiversity conservation. Our resulting evaluation data processing flow originated from our group process analysis applied to the Carajás region (Brazil) in which we identified the probable losses of nectarivorous bat species (pollinators), on the order of 66% (Costa et al. 2018); nectarivorous birds, on the order of 60% (Miranda et al. 2019); and bees, on the order of 85% (Giannini et al. 2020) until 2050. Our process, described using the Business Process Model and Notation (BPMN) is represented in Fig. 1. Our group is preparing a data paper with all of our generated data and programs/libraries to be released as soon as possible.

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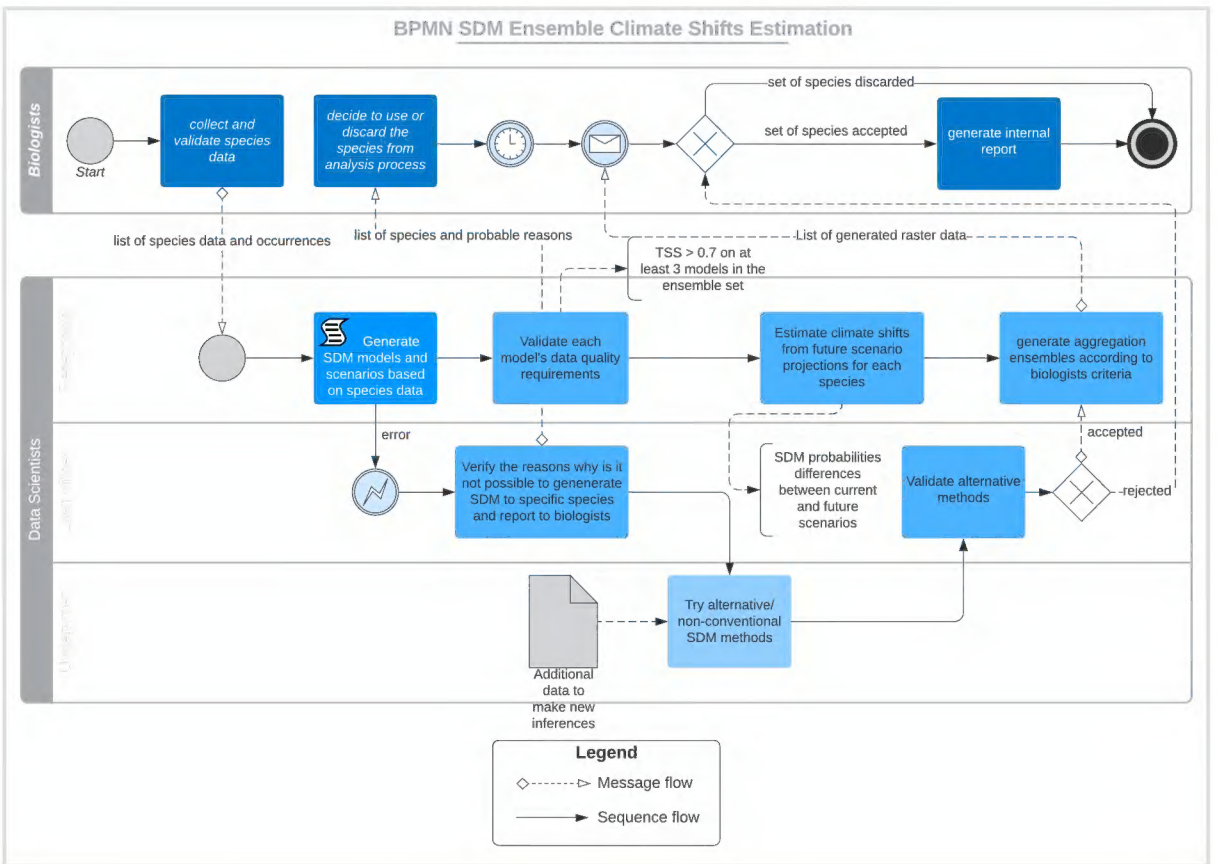
BPMN SDM Ensemble Climate Shifts Estimation
Biologists
Start
collect and validate species data
decide to use or discard the species from analysis process
set of species discarded
set of species accepted
generate internal report
list of species data and occurrences
list of species and probable reasons
List of generated raster data
TSS > 0.7 on at least 3 models in the ensemble set
Data Scientists
Generate SDM models and scenarios based on species data
Validate each model's data quality requirements
Estimate climate shifts from future scenario projections for each species
generate aggregation ensembles according to biologists criteria
error
accepted
rejected
Verify the reasons why is it not possible to genenerate SDM to specific species and report to biologists
SDM probabilities differences between current and future scenarios
Validate alternative methods
Try alternative/ non-conventional SDM methods
Additional data to make new inferences
Legend
Message flow
Sequence flow

Figure 1.

Business Process Model and Notation (BPMN) for our Species Distribution Model (SDM) ensemble of climate shifts estimation.

Keywords

Business Process Model and Notation, species distribution model, climate change, ensemble model process, biodiversity data extraction and tranformation process

Presenting author

Wilian França Costa

Presented at

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